

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**REQUEST FOR FILING NATIONAL PHASE OF**  
**PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495**

To: Hon. Commissioner of Patents  
 Washington, D.C. 20231



00909

TRANSMITTAL LETTER TO THE UNITED STATES  
 DESIGNATED/ELECTED OFFICE (DO/EO/US)

Atty Dkt: PM 275671 /2980260US/HM/her  
M# /Client Ref.

From: Pillsbury Madison & Sutro LLP, IP Group:

Date: January 24, 2001

This is a **REQUEST** for **FILING** a PCT/USA National Phase Application based on:

- |  |  |             |             |             |     |       |      |   |           |             |             |     |       |      |
|--|--|-------------|-------------|-------------|-----|-------|------|---|-----------|-------------|-------------|-----|-------|------|
| 1. International Application<br><br><u>PCT/FI99/00639</u><br><u>↑ country code</u> | 2. International Filing Date<br><br><table border="0"> <tr> <td><u>26</u></td> <td><u>July</u></td> <td><u>1999</u></td> </tr> <tr> <td>Day</td> <td>MONTH</td> <td>Year</td> </tr> </table> | <u>26</u>   | <u>July</u> | <u>1999</u> | Day | MONTH | Year | 3. Earliest Priority Date Claimed<br><br><table border="0"> <tr> <td><u>28</u></td> <td><u>July</u></td> <td><u>1998</u></td> </tr> <tr> <td>Day</td> <td>MONTH</td> <td>Year</td> </tr> </table> (use item 2 if no earlier priority) | <u>28</u> | <u>July</u> | <u>1998</u> | Day | MONTH | Year |
| <u>26</u>  | <u>July</u>  | <u>1999</u> |             |             |     |       |      |   |           |             |             |     |       |      |
| Day  | MONTH  | Year        |             |             |     |       |      |   |           |             |             |     |       |      |
| <u>28</u>  | <u>July</u>  | <u>1998</u> |             |             |     |       |      |   |           |             |             |     |       |      |
| Day  | MONTH  | Year        |             |             |     |       |      |   |           |             |             |     |       |      |
4. Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:

(a) ☐ 20 months from above item 3 date      (b) ☒ 30 months from above item 3 date,

(c) Therefore, the due date (unextendable) is January 28, 2001

Title of Invention CONTROLLING PERIPHERAL DEVICE COMMUNICATION SYSTEM

Inventor(s) SUONVIERI, Jukka

Applicant herewith submits the following under 35 U.S.C. 371 to effect filing:

7. ☒ Please immediately start national examination procedures (35 U.S.C. 371 (f)).
8. ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:
- a. ☐ Request;
- b. ☐ Abstract;
- c.      pgs. Spec. and Claims;
- d.      sheet(s) Drawing which are ☐ informal ☐ formal of size ☐ A4 ☐ 11"
9. ☒ A copy of the International Application has been transmitted by the International Bureau.
10. A translation of the International Application into English (35 U.S.C. 371(c)(2))
- a. ☒ is transmitted herewith including: (1) ☒ Request; (2) ☒ Abstract;
- (3) 12 pgs. Spec. and Claims;
- (4) 3 sheet(s) Drawing which are:
- ☐ informal ☒ formal of size ☒ A4 ☐ 11"
- b. ☐ is not required, as the application was filed in English.
- c. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
- d. ☐ Translation verification attached (not required now).
11. ☒ **PLEASE AMEND** the specification before its first line by inserting as a separate paragraph:
- a. ☒ --This application is the national phase of international application PCT/FI99/00639 filed July 26, 1999 which designated the U.S. and that international application ☒ was ☐ was not published under PCT Article 21(2) in English.--
- b. ☐ --This application also claims the benefit of U.S. Provisional Application No. 60/    , filed      .--

12. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., before 18th month from first priority date above in item 3, are transmitted herewith (file only if in English) including:
13. ☒ PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau
14. ☐ Translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of **claim amendments** made before 18th month, is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered canceled).
15. **A declaration of the inventor** (35 U.S.C. 371(c)(4))  
 a. ☒ is submitted herewith ☒ Original ☐ Facsimile/Copy  
 b. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
16. **An International Search Report (ISR):**  
 a. Was prepared by ☐ European Patent Office ☐ Japanese Patent Office ☒ Other  
 b. ☒ has been transmitted by the international Bureau to PTO.  
 c. ☒ copy herewith (1 pg(s).) ☒ plus Annex of family members (1 pg(s).).
17. **International Preliminary Examination Report (IPER):**  
 a. ☒ has been transmitted (if this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.  
 b. ☒ copy herewith in English.  
 c.1 ☐ IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:  
 c.2 ☐ Specification/claim pages #\_\_\_ claims #  
 Dwg Sheets #  
 d. ☐ Translation of Annex(es) to IPER (required by 30<sup>th</sup> month due date, or else annexed amendments will be considered canceled).
18. **Information Disclosure Statement** including:  
 a. ☒ Attached Form PTO-1449 listing documents  
 b. ☒ Attached copies of documents listed on Form PTO-1449  
 c. ☒ A concise explanation of relevance of ISR references is given in the ISR.
19. ☒ **Assignment** document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.
20. ☐ Copy of Power to IA agent.
21. ☐ **Drawings** (complete only if 8d or 10a(4) not completed): \_\_ sheet(s) per set: ☐ 1 set informal; ☐ Formal of size ☐ A4 ☐ 11"
22. Small Entity Status ☐ is **Not** claimed ☐ is claimed (pre-filing confirmation required)
- 22(a) \_\_ (No.) Small Entity Statement(s) enclosed (since 9/8/00 Small Entity Statements(s) not essential to make claim)
23. **Priority** is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) FINLAND of:
- |     | <u>Application No.</u> | <u>Filing Date</u> |     | <u>Application No.</u> | <u>Filing Date</u> |
|-----|------------------------|--------------------|-----|------------------------|--------------------|
| (1) | 981668                 | July 28, 1998      | (2) |                        |                    |
| (3) |                        |                    | (4) |                        |                    |
| (5) |                        |                    | (6) |                        |                    |
- a. ☒ See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
- b. ☐ Copy of Form PCT/IB/304 attached.

25. **Preliminary Amendment:** Claim 3, line 1, delete " or 2 "  
Claim 6, line 1, delete " or 5 "  
Claims 7 & 8, line 1, change " any one . . . to 6 & to 7 " to -- claim 4 --  
Claim 11, line 1, delete " or 10 "  
Claims 12 & 13, line 1, change "any one . . . to 11 & to 12" to -- claim 9 --

25.5 Per Item 17.c2, **cancel original** pages #\_\_, claims #\_\_, Drawing Sheets #

26. **Calculation of the U.S. National Fee (35 U.S.C. 371 (c)(1)) and other fees is as follows:**

Based on amended claim(s) per above item(s) ☐ 12, ☐ 14, ☐ 17, ☒ 25, ☐ 25.5 (hilitte)

Total Effective Claims	13	minus 20 =	0	x \$18/\$9	=	\$0	966/967
Independent Claims	3	minus 3 =	0	x \$80/\$40	=	\$0	964/965
If any proper (ignore improper) Multiple Dependent claim is present,				add \$270/\$135	+	0	968/969

**BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4)): →→ BASIC FEE REQUIRED, NOW →→→→**

A. If country code letters in item 1 are not "US", "BR", "BB", "TT", "MX", "IL", "NZ", "IN" or "ZA"

See item 16 re:

- |  |                  |         |
|--|------------------|---------|
| 1. Search Report was <u>not</u> prepared by EPO or JPO ----- | add \$1000/\$500 | 960/961 |
| 2. Search Report was prepared by EPO or JPO -----            | add \$860/\$430  | 970/971 |
|  | <b>+1000</b>     |         |

**SKIP B, C, D AND E UNLESS country code letters in item 1 are "US", "BR", "BB", "TT", "MX", "IL", "NZ", "IN" or "ZA"**

- |   |                 |    |         |
|---|-----------------|----|---------|
| → <input type="checkbox"/> B. If <u>USPTO</u> did not issue <u>both</u> International Search Report (ISR) <u>and</u> (if box 4(b) above is X'd) the International Examination Report (IPER), -----                    | add \$970/\$485 | +0 | 960/961 |
| → <input type="checkbox"/> C. If <u>USPTO</u> issued ISR but not IPER (or box 4(a) above is X'd), -----   | add \$710/\$355 | +0 | 958/959 |
| → <input type="checkbox"/> D. If <u>USPTO</u> issued IPER but IPER Sec. V boxes <u>not all</u> 3 YES, -----   | add \$690/\$345 | +0 | 956/957 |
| → <input type="checkbox"/> E. If international preliminary examination fee was paid to <u>USPTO</u> and Rules 492(a)(4) and 496(b) <u>satisfied</u> (IPER Sec. V <u>all</u> 3 boxes YES for <u>all</u> claims), ----- | add \$100/\$50  | +0 | 962/963 |

27. **SUBTOTAL = \$1000**

28. If Assignment box 19 above is X'd, add Assignment Recording fee of ---\$40 **+40** (581)

29. Attached is a check to cover the ----- **TOTAL FEES \$1040**

Our Deposit Account No. 03-3975

Our Order No. 60258 275671  
C# M#



00909

**CHARGE STATEMENT:** The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 and 492 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order Nos. shown above for which purpose a duplicate copy of this sheet is attached.

This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal form is filed

**Pillsbury Winthrop LLP  
Intellectual Property Group**

By Atty: Richard C. Irving

Reg. No. 38499

Sig:

*Richard C. Irving*

Fax: (202) 822-0944  
Tel: (202) 861-3788

Atty/Sec: RCI/mhn

**NOTE:** File in duplicate with 2 postcard receipts (PAT-103) & attachments.

CONTROLLING PERIPHERAL DEVICE IN COMMUNICATION SYSTEM

The present invention relates to a method of controlling and supervising a peripheral device in a communication system. The invention is applicable to e.g. cellular radio systems and particularly to WLL systems (Wireless Local Loop), with reference to which the invention is herein primarily described. It is to be understood, however, that the invention is applicable in other connections as well, e.g. in a fixed telephone network.

A problem in controlling subscriber stations in communication systems is that subscriber stations often are in subscribers' possession, and so the maintenance personnel of an operator do not have easy access to them. For example in WLL systems, in which a subscriber is provided with a terminal equipment intended to be stationary, said terminal equipment is usually located fixed in its place on subscriber premises. A WLL terminal may be comprised of a radio part and a teleadapter, to which a user interface, e.g. a telephone set, a telefax terminal, a computer-modem combination or the like, is connected.

As in WLL systems the terminal equipment is on subscriber premises, the operator has to be able to supervise and control its operation via the radio path. This is necessary e.g. in reconfiguring the system, when the telecommunication settings of a subscriber station have to be adjusted to correspond to e.g. a new radio cell created in the system. Correspondingly, the operator should also be able to supervise the operation of a terminal equipment in such a way that the operator can be sure that the terminal equipment operates in the desired manner.

Known radio systems comprise a subscriber station management system, by means of which the operator can supervise and manage the operation of the subscriber stations within the system. In practice, the management system usually comprises a computer unit programmed to carry out certain supervisory routines and to receive alarms transmitted by the subscriber stations. The subscriber station management system communicates with the subscriber stations via the radio path, by means of control signals transmitted and received by the base stations of the system. For example, if an alarm goes off in a subscriber station, said subscriber station conveys this information by sending the alarm via the radio path to the base station, from where the alarm is forwarded to the subscriber station management system.

In known communication systems, a variety of peripheral devices are used. One of the peripheral devices known from radio systems is the repeater, which repeats signals of a base station to a shadow area which the signals transmitted by the base station do not otherwise reach (e.g. to the interiors of buildings). The coverage area of a base station can thus be spread to areas its signals would not otherwise reach. In order for the peripheral devices to be used in a radio system to operate in the desired manner, their management should be taken into account already in the network design. In known radio systems, a specific management system has been created for managing peripheral devices, by means of which system control signals are transmitted to the peripheral devices via the radio path. In order for peripheral devices to be able to receive control signals transmitted to them via the radio path, they have to be connected to a radio receiver. In practice, a subscriber station, to which the peripheral device is connected, is brought in contact with the peripheral device. Thus, the management system for the peripheral devices is practically in connection with the subscriber station e.g. by means of a data call or a short message, and said subscriber station in turn forwards the received control signals to the peripheral device.

A weakness of known communication systems is that the peripheral devices used in a system require their own specific management system. This makes the communication system more complicated and increases its costs due to the equipment investments required by the management system for the peripheral devices. Further, the maintenance of the management system for the peripheral devices is relatively laborious, as reconfigurations carried out in the network, for example, may require changes in the management system for peripheral devices as well.

The object of the present invention is to solve the above problem and to provide a solution by which the management of peripheral devices used in communication systems is facilitated without any need to invest heavily in equipment in order to implement the management system. This object is achieved by the method of the invention of controlling a peripheral device in a communication system comprising network elements and subscriber stations in data transmission connection with each other, and a subscriber station management system supervising and controlling the operation of the subscriber stations by control signals, and in which method said peripheral device is connected to a subscriber station. The method of the invention is character-

ized in that it comprises the steps of: arranging control means to the subscriber station for controlling and supervising the peripheral device, and controlling the peripheral device by means of the subscriber station management system by transmitting control signals from the subscriber station management system to the control means of the subscriber station, in response to which control signals the control means control and supervise the operation of the peripheral device.

The invention also relates to a communication system, to which the method of the invention can be applied, comprising subscriber stations comprising means for transmitting and receiving telecommunication signals, network elements in data transmission connection with the subscriber stations, a subscriber station management system comprising means for controlling and supervising the operation of the subscriber stations by means of the network elements, and at least one subscriber station to which a peripheral device is connected. The communication system of the invention is characterized in that the subscriber station management system comprises means for controlling and supervising the peripheral device connected to the subscriber station by means of control signals transmitted to the subscriber station.

The invention further relates to a subscriber station in a communication system comprising: means for transmitting and receiving telecommunication signals in order to set up a data transmission connection to the other parts of the system, means for controlling the operation of the subscriber station in response to received control signals and for transmitting data on the state of the subscriber station to the other parts of the system, and connecting means for connecting the peripheral device to the subscriber station. The subscriber station of the invention is characterized by comprising control means responsive to the received control signals to control and supervise the operation of the peripheral device connected to the subscriber station in response to the control signals.

The invention is based on the idea that the management of peripheral devices in a communication system will become easier and the costs are reduced considerably when the management system for the peripheral devices is integrated into the subscriber station management system. Thus, two parallel management systems are not needed in the communication system; the same management system can manage both the subscriber stations and the peripheral devices. Since the peripheral devices are in practice anyway in

connection with the other network parts by means of a subscriber station connected to them, and since the subscriber station management system still has to control and supervise said subscriber station, the subscriber station management system can with very slight changes also be utilised for controlling and supervising the operation of a peripheral device. In practice, the required change can be carried out by storing a management program in the memory of the subscriber station, by means of which program the subscriber station is able to control and supervise the peripheral device. A corresponding change is also made to the subscriber station management system, i.e. a new management program is stored therein. Thus, the subscriber station management system can control the peripheral device via the subscriber station.

The most significant advantages provided by the solution of the invention are thus the simplification of the network management system and the decrease in equipment costs, because the subscriber station management system and the management system for the peripheral devices can be integrated into one single management system. In addition, the situation can be avoided in which two separate management systems transmit control signals to the same subscriber stations, as a result of which the load in the network decreases. The invention also facilitates network reconfigurations, as instead of two separate management systems, the operator only has to make alterations to the subscriber station management system.

In a preferred embodiment of the system of the invention, a subscriber station to which a peripheral device is connected, comprises a WLL terminal with a memory in which a control program for managing said peripheral device can be stored. This preferred embodiment of the invention provides e.g. the advantage that the WLL terminal, which does not have a user interface (such as a telephone handset or a pushbutton dial plate), has a very simple structure, and thus its manufacturing costs are relatively low. When the management program designed for said peripheral device is stored in the WLL terminal, the additional advantage is gained that the implementation of the subscriber station management system on the network side is simpler than before. Thus, instead of having to make considerable changes to the subscriber station management system controlling and supervising peripheral devices according to the invention in order to manage said peripheral device, these changes can be made to the subscriber station. So, besides data on the state of the peripheral device and control commands, other data need not be

transmitted between the subscriber station and the subscriber station management system. In case of a potential defect in the peripheral device, the subscriber station takes the required measures according to the control program and only transmits data on the defect to the network control system.

5 The preferred embodiments of the method, radio system and subscriber station of the invention are disclosed in the attached dependent claims 2, 5 to 8 and 10 to 13.

In the following the invention will be described in greater detail with reference to the attached drawings, in which:

10 Figure 1 shows a block diagram of a prior art communication system,

Figure 2 shows a block diagram of a first preferred embodiment of the communication system of the invention,

15 Figure 3 shows a block diagram of a first preferred embodiment of the subscriber station of the invention, and

Figure 4 shows a flowchart of a first preferred embodiment of the method of the invention.

Figure 1 shows a block diagram of a prior art communication system. The system in Figure 1 can be e.g. a GSM system (Global System for Mobile communications). In Figure 1, the system in question serves both common mobile stations MS and stationary WLL subscribers 2 and 3. Stationary WLL subscribers refer herein to subscribers who are provided with all the other GSM network services except mobility. Thus, a home cell is usually assigned for WLL subscribers, which cell is the only radio cell belonging to the system, in which they can be used. Common mobile stations with unlimited mobility can naturally be used in any radio cell of the system in Figure 1.

25 Figure 1 shows a mobile services switching centre MSC, which is in connection with a home location register HLR maintaining subscriber data on subscribers MS and 2 to 3 within the system. The mobile services switching centre is also in connection with two base stations BTS1 and BTS2 via a base station controller BSC. Via said base stations, calls can be made from the subscriber stations MS and 2 to 3 e.g. to the subscriber stations of the fixed network PSTN (Publicly Switched Telephone Network).

30 The system of Figure 1 further comprises a repeater 5, by means of which the base station BTS2 can establish a radio link to the WLL subscriber station 3. In other words, the WLL subscriber station 3 is located in a shadow



area, and it is thus not able to communicate directly with the base station BTS2. On this account, the repeater 5 is tuned to repeat the traffic channels used by the base station BTS2 in such a way that the base station BTS2 and the WLL subscriber station 3 are able to communicate with each other.

5 In order for the operator of the system in Figure 1 to be able to manage the peripheral devices belonging to the system, a management system 6 for the peripheral devices is arranged to a maintenance centre 4 of the network. Said management system supervises the operation of the peripheral devices and, among other things, receives alarms from them when disturbances occur. For example in Figure 1, the management system 6 for the peripheral devices can comprise a computer unit transmitting status inquiries at regular intervals to the repeaters of the system according to a particular computer program. The repeater 5 receives such a status inquiry as control signals CNT2 proceeding from the mobile services switching centre MSC via the base station controller BSC to the base station BTS2, from where they are transmitted via the radio path to the repeater 5. Another situation in which control signals CNT2 are transmitted to the repeater 5 can be e.g. network reconfiguration, whereby the traffic channels of the base station BTS2 change, and the repeater 5 is commanded to change the frequencies of the channels repeated by it by means of the control signals CNT2. The repeater 5 can further be programmed e.g. to transmit measurement reports automatically at regular intervals, which reports are conveyed via the base station BTS2 to the network and further to the management system 6 of the peripheral devices.

Besides the management system for the peripheral devices described above, the maintenance centre 4 also comprises a management system 7 for the WLL subscriber stations. Said management system supervises and controls the operation of the WLL subscriber stations 2 and 3 in such a manner that potential malfunctions are observed as early as possible. This may e.g. be carried out such that at regular intervals, the subscriber station management system 7 transmits alternately to each of the WLL subscriber stations a call, to which the subscriber stations 2 and 3 are programmed to reply automatically. If a subscriber station does not reply, the management system 7 for the WLL subscribers interprets it in such a way that the subscriber station in question is not operating, after which it indicates an alarm concerning the subscriber station in question to the operator.

The management system for the WLL subscribers may also control

the operation of the subscriber stations 2 and 3. This may be necessary e.g. if a radio cell is congested. In such case, the subscriber station management system 7 can transmit a command via the control signals CNT1 to a subscriber station to proceed to another cell. This means in practice that the subscriber station is commanded via the control signals to use another radio cell for its connections, whereby the subscriber station locks onto the control channel of its new home cell. From the above description can be noticed that both the subscriber station management system 7 and the management system 6 for the peripheral devices load the base station BTS2, for instance, as both management systems transmit their own control signals CNT1 and CNT2 via said base station.

Figure 2 shows a block diagram of a first preferred embodiment of the communication system of the invention. The system in Figure 2 resembles closely the system shown in Figure 1. The system in Figure 2 differs, however, from the prior art system shown in Figure 1 in that the subscriber station management system 8 supervises and controls both the subscriber stations 2 and 3 and the peripheral devices 15. Thus, the operator maintenance centre 14 has no need of two separate management systems, but both the subscriber stations and the peripheral devices can be supervised and managed by one and the same management system 8.

In Figure 2, a WLL terminal 16 has been arranged in connection with the repeater 15. The subscriber station management system 8 supervises and controls the repeater 15 via control signals CNT3 transmitted to the WLL terminal. The structure of the repeater 15 is described in greater detail in Figure 3.

Figure 3 shows a block diagram of a first preferred embodiment of the subscriber station of the invention. The subscriber station 16 of Figure 3 can comprise e.g. a WLL terminal comprising a radio unit TRX and a memory 17, processing means 18 and an interface 19. In Figure 3, a peripheral device, i.e. the repeater 15, is connected to a bus 20 in said subscriber station (the subscriber station 16 can also be integrated into the repeater 15).

In Figure 3, the subscriber station comprises the interface 19, via which a program can be stored in its memory 17. The program can be stored e.g. in such a way that a maintenance person connects a portable computer to the interface 19, after which the program is transferred from the computer to the memory 17 via the terminal interface 19. The control program in question

is specifically designed for the peripheral device 15, i.e. the repeater. Unlike in Figure 3, a subscriber station can also be implemented in such a manner that the program is transmitted to the subscriber station via the radio path, after which the subscriber station stores it in the memory 17. In such case, a maintenance person is not needed to store the program in the subscriber station.

While in use, the processing means 18 of the subscriber station supervise and control the operation of said peripheral device 15 according to the program stored in the memory. The subscriber station 16 is thus able to e.g. receive alarms from the repeater 15. Having received such an alarm, the processing means 18 may transmit an alarm through the radio unit TRX to the subscriber station management system via the radio path. The subscriber station management system 8 and the radio part of the subscriber station 16 can communicate with each other e.g. by a data call or short messages. Data on the peripheral device connected to said subscriber station 16 is stored in the subscriber station management system, and so the subscriber station management system is able to handle the error code received from the subscriber station 16 correctly.

Correspondingly, the subscriber station 16 can receive via the radio unit TRX from the subscriber station management system e.g. control signals indicating that the frequency channels of the repeater should be changed. In such a case the processing means 18 of the subscriber station control the repeater via the bus 20 in such a manner that the frequency channels repeated by the repeater change to correspond to the new frequency channels assigned by the control signals of the subscriber station management system.

The subscriber station management system 8 may be programmed to transmit alternately to each WLL terminal within its area a call, by which it advises the subscriber stations to convey e.g. measurement results to the management system 8. Equally, the management system 8 sends such a call also to the subscriber station 16. As the peripheral device 15 is connected to the subscriber station 16, the memory 17 of the subscriber station 16 includes a program which makes the subscriber station 16 answer this call by transmitting to the subscriber station management system also data on the peripheral device 15. In case of a repeater, such data may be e.g. the frequency channels that are repeated by the repeater. The subscriber station management system is aware that a peripheral device is connected to the subscriber station, and thus it is also able to receive and handle data on the peripheral de-

vice.

Unlike in Figures 2 and 3, a peripheral device connected to a subscriber station can naturally also be some other peripheral device than a repeater. Other examples of peripheral devices are e.g. a burglar alarm, an anemometer and a surveillance camera.

Figure 4 shows a flowchart of a first preferred embodiment of the method of the invention. The flowchart of Figure 4 is applicable e.g. to the supervision and control of a peripheral device located in the coverage area of a mobile communication system.

In block A, a peripheral device is connected to a subscriber station. The subscriber station comprises preferably e.g. a WLL terminal, which does not comprise a user interface (such as a handset or a pushbutton dial plate) and whose costs are thus relatively low.

In block B, a program designed for controlling the peripheral device is stored in the subscriber station. Thus, the peripheral device is controlled and supervised to the largest possible extent by the subscriber station, and the number of control signals transmitted via the radio path can be minimized.

In block C, data is stored in the subscriber station management system indicating that a peripheral device is connected to the subscriber station. At the same time, a program for managing said peripheral device (by the subscriber station) is stored in the management system. Thus, the subscriber station management system is able to communicate with the subscriber station in such a way that the peripheral device can be controlled and supervised in the desired manner.

In block D, the peripheral device is controlled by transmitting control signals from the subscriber station management system to the subscriber station. The subscriber station in turn reacts to the control signals according to the control program stored therein.

It is to be understood that the above description and the related drawings are only intended to illustrate the invention. Consequently, although the invention has been described above specifically with reference to radio systems, it is also applicable in other connections, e.g. in a fixed telephone network. Variations and modifications of the invention will be apparent to a person skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

## CLAIMS

1. A method of controlling a peripheral device in a communication system comprising network elements and subscriber stations in data transmission connection with each other, and a subscriber station management system supervising and controlling the operation of the subscriber stations by control signals, and in which method said peripheral device is connected to a subscriber station, **characterized** in that the method comprises the steps of:

arranging control means to the subscriber station for controlling and supervising the peripheral device, and

controlling the peripheral device by means of the subscriber station management system by transmitting control signals from the subscriber station management system to the control means of the subscriber station, in response to which control signals the control means control and supervise the operation of the peripheral device.

2. A method as claimed in claim 1, **characterized** by said communication system being a radio system, and the network elements consisting of base stations, whereby the control signals transmitted from the subscriber station management system are transmitted via the radio path to said subscriber station.

3. A method as claimed in claim 1 or 2, **characterized** by the control means arranged to the subscriber station comprising at least a memory and processing means, the method further comprising the steps of:

storing a control program in the memory of the subscriber station to control the peripheral device, and

adapting the processing means to control the peripheral device on the basis of the control program stored in the memory and the control signals transmitted by the subscriber station management system.

4. A communication system comprising  
subscriber stations (2, 3, 16, MS) comprising means for transmitting and receiving telecommunication signals,  
network elements (BTS1, BTS2) in data transmission connection with the subscriber stations,

a subscriber station management system (8) comprising means for controlling and supervising the operation of the subscriber stations (2, 3, 16)

by means of the network elements, and

at least one subscriber station (16), to which a peripheral device (15) is connected, **characterized** in that

the subscriber station management system (8) comprises means for  
5 controlling and supervising the peripheral device (15) connected to the subscriber station (16) by means of control signals (CNT3) transmitted to the subscriber station (16).

5. A communication system as claimed in claim 4, **characterized** in that said communication system is a radio system, that the network elements are base stations (BTS1, BTS2) which are in data transmission  
10 connection with the subscriber stations via radio signals, and that the control signals (CNT3) of the management system (8) are transmitted to said subscriber station via the radio path.

6. A communication system as claimed in claim 4 or 5, **characterized** in that said subscriber station (16) is a WLL terminal, and that said  
15 subscriber station management system is the management system (8) of the WLL terminals.

7. A communication system as claimed in any one of claims 4 to 6, **characterized** in that the subscriber station (16) comprises control  
20 means (17, 18) for controlling and supervising the operation of the peripheral device (15) connected to a control bus (20) in the subscriber station, and that the subscriber station management system (8) comprises means for controlling the control means (17, 18) of the subscriber station via the control signals (CNT3) to be transmitted to the subscriber station (16).

8. A communication system as claimed in any one of claims 4 to 7, **characterized** in that the subscriber station (16) comprises processing  
25 means (18), a memory (17) and means (19) for storing a predetermined control program of the peripheral device in the memory, whereby the processing means (18) control said peripheral device (15) on the basis of the program stored in the memory (17) and the control signals (CNT3) conveyed by the  
30 subscriber station management system (8).

9. A subscriber station (16) in a communication system comprising:  
means (TRX) for transmitting and receiving telecommunication signals in order to set up a data transmission connection to the other parts of the  
35 system,

means for controlling the operation of the subscriber station in re-

sponse to received control signals (CNT3) and for transmitting data on the state of the subscriber station to the other parts of the system, and

connecting means (20) for connecting the peripheral device to the subscriber station, **characterized** by

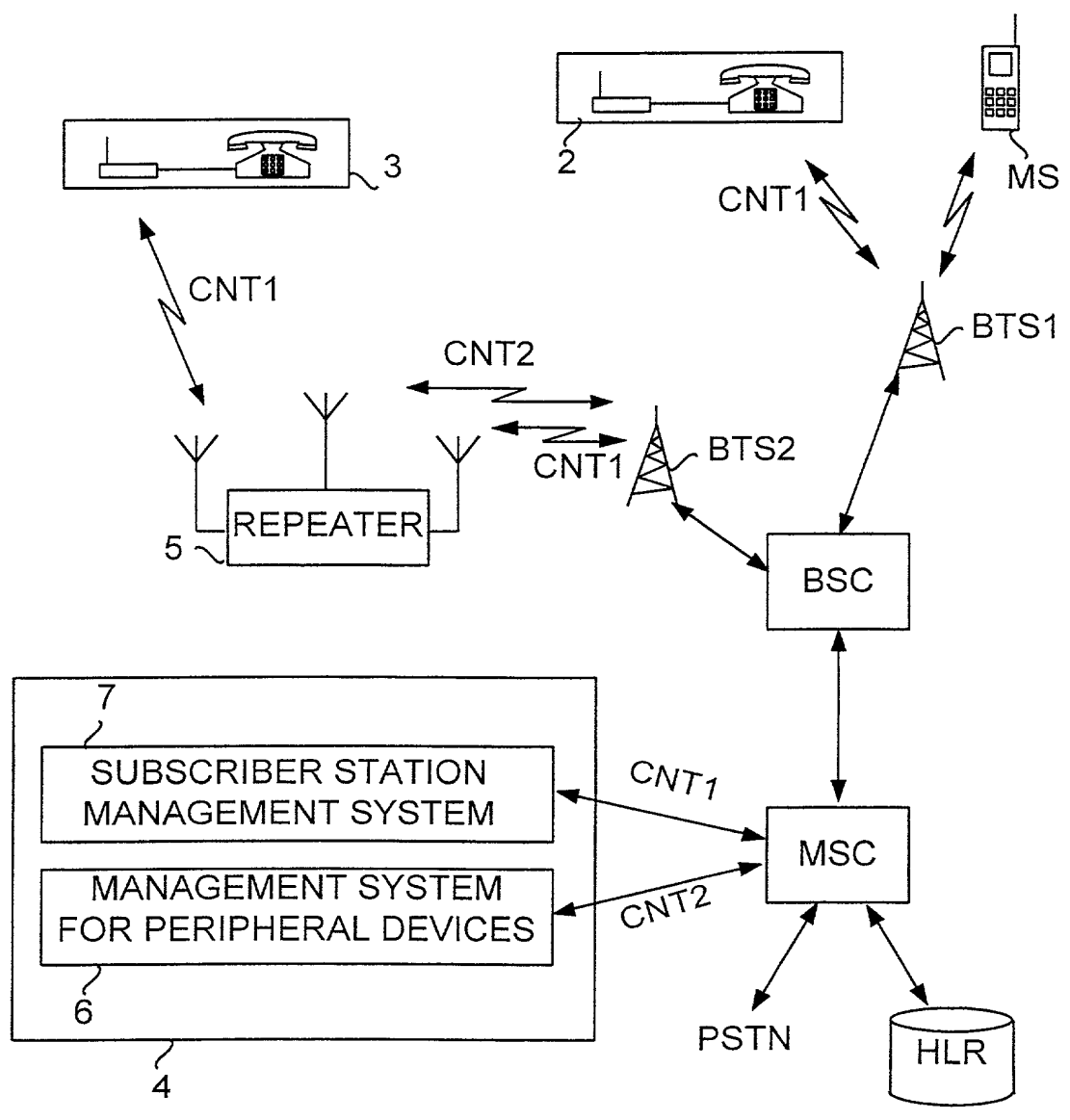
5 the subscriber station (16) comprising control means (17, 18) responsive to the received control signals to control and supervise the operation of the peripheral device (15) connected to the subscriber station in response to the control signals (CNT3).

10 10. A subscriber station as claimed in claim 9, **characterized** in that said subscriber station is a subscriber station in a radio system, and that said subscriber station comprises means for receiving said control signals via the radio path and for transmitting data on the state of said subscriber station to the other parts of the system via the radio path.

15 11. A subscriber station as claimed in claim 9 or 10, **characterized** in that said subscriber station (16) is a WLL terminal, and that said control means (17, 18) control the operation of the peripheral device (15) connected to the subscriber station in response to the control signals (CNT3) received from the management system (8) of the WLL terminals via the radio path.

20 12. A subscriber station as claimed in any one of claims 9 to 11, **characterized** in that the subscriber station (16) comprises processing means (18), a memory (17) and means (19) for storing a predetermined control program of the peripheral device in the memory (17), whereby the processing means (18) control said peripheral device on the basis of the program stored in the memory (18) and the control signals (CNT3) conveyed by the management system (8).

25 13. A subscriber station as claimed in any one of claims 9 to 12, **characterized** in that said peripheral device (16) is a repeater connected to the control bus (20) of the subscriber station.



PRIOR ART

FIG. 1



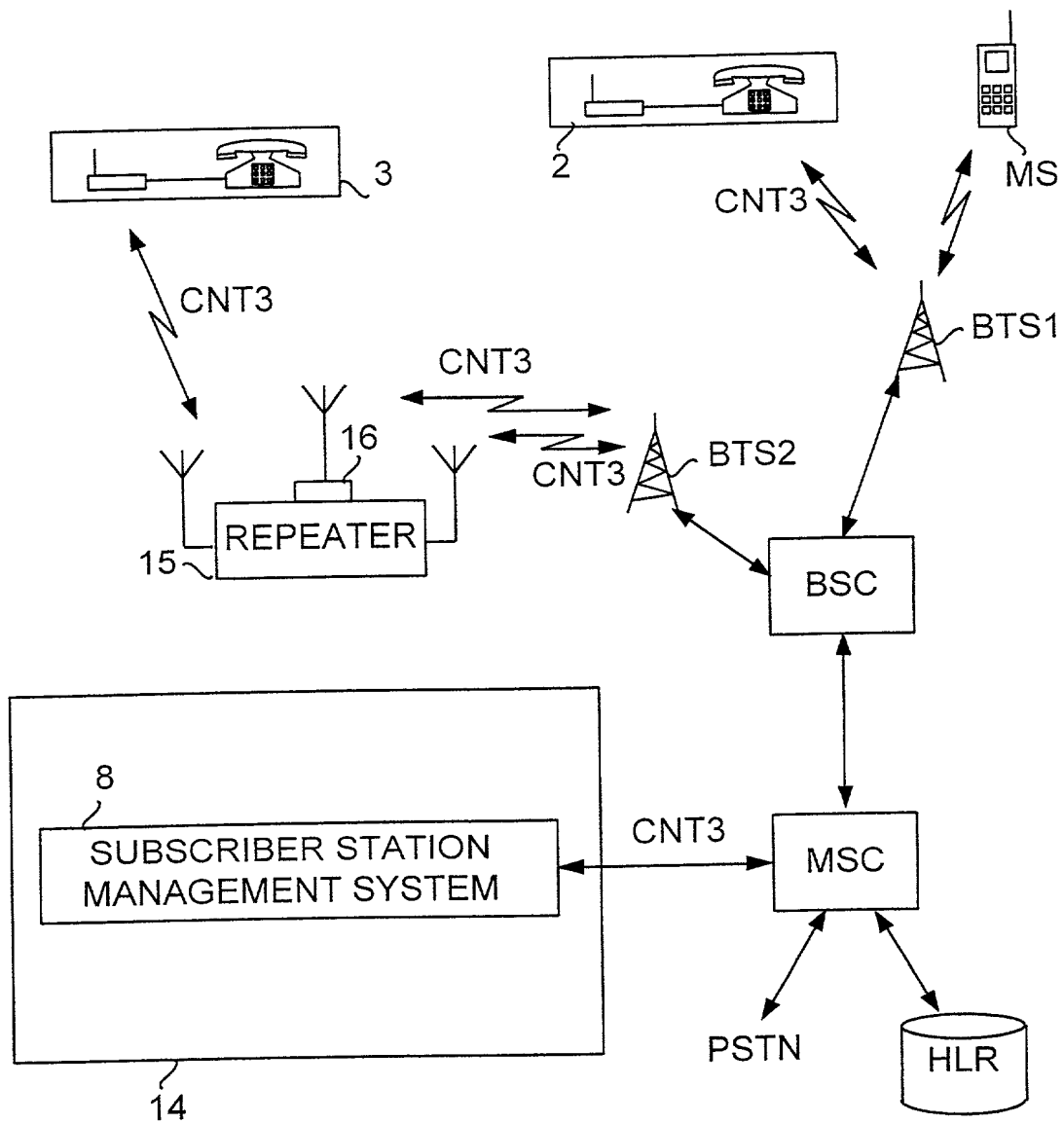


FIG. 2

3/3

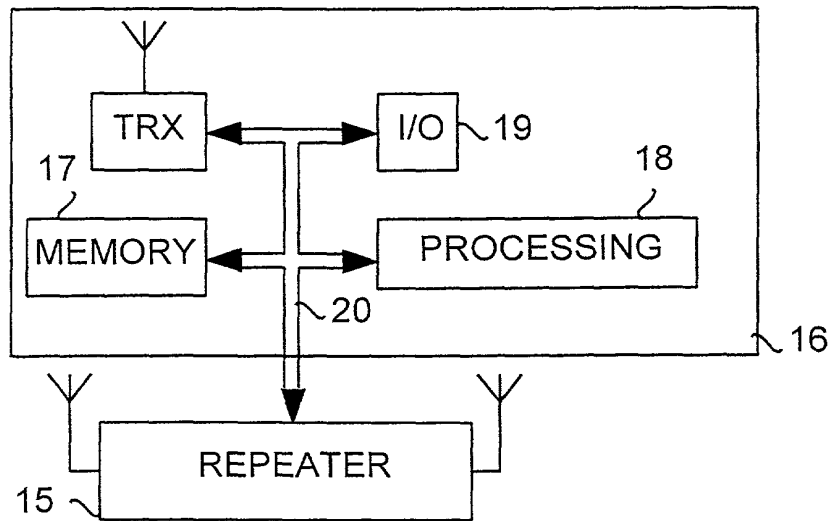


FIG. 3

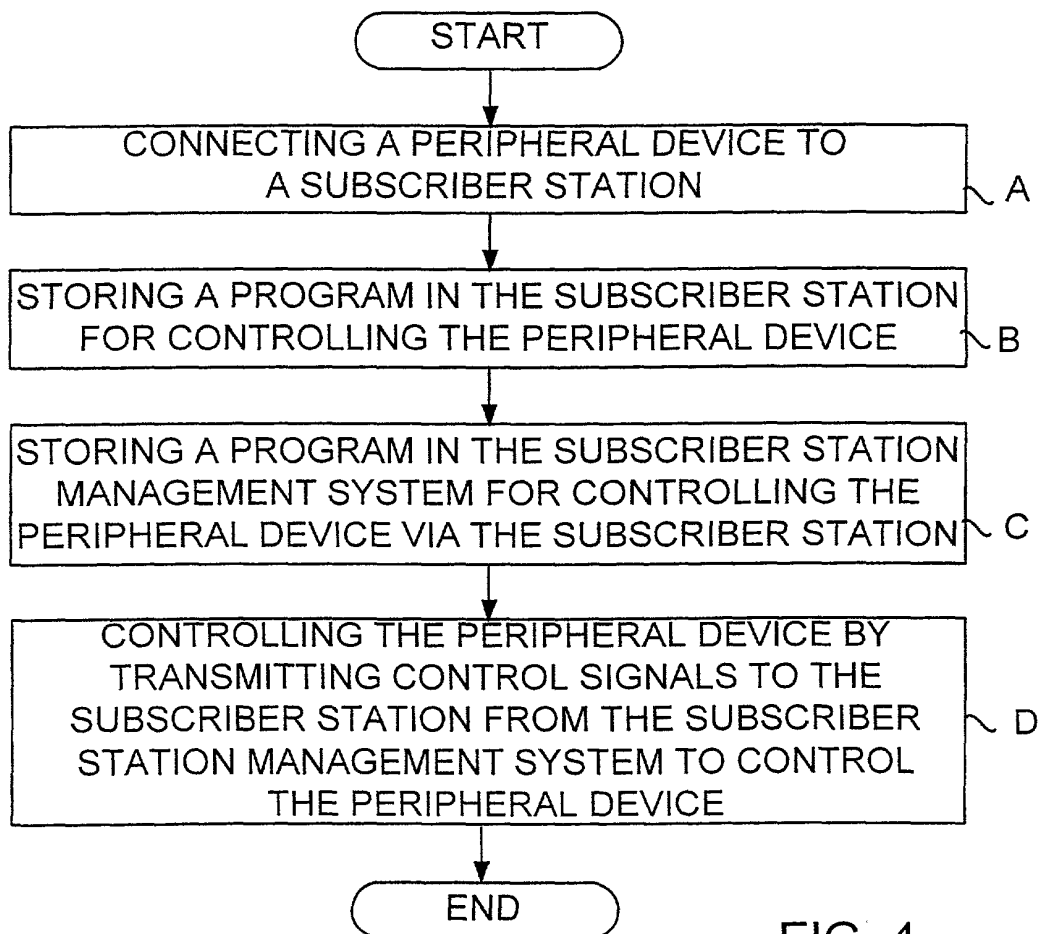


FIG. 4

FOR UTILITY/DESIGN  
GIR/PCT NATIONAL/PLANT  
ORIGINAL/SUBSTITUTE/SUPPLEMENTAL  
DECLARATIONS

RULE 63 (37 C.F.R. 1.63)  
DECLARATION AND POWER OF ATTORNEY  
FOR PATENT APPLICATION  
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

290000  
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FORM

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the INVENTION ENTITLED  
Controlling peripheral device in communication system

the specification of which (CHECK applicable BOX(ES))  
X → A. ☐ is attached hereto.  
BOX(ES) → B. ☐ was filed on \_\_\_\_\_ as U.S. Application No. \_\_\_\_\_ /  
→ C. ☒ was filed as PCT International Application No. PCT/ FI99 / 00639 on 26 July 1999

and (if applicable to U.S. or PCT application) was amended on \_\_\_\_\_

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International Application which designated at least one other country than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International Application, filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority claimed, before the filing date of this application:

PRIOR FOREIGN APPLICATION(S)			Date first Laid- open or Published	Date Patented or Granted	Priority Claimed Yes No
Number	Country	Day/MONTH/Year Filed			
981668	FI	28 July 1998			X

I hereby claim domestic priority benefit under 35 U.S.C. 119(e) or 120 and 365(c) of the indicated United States applications listed below and PCT International applications listed above or below and, if this is a continuation-in-part (CIP) application, insofar as the subject matter disclosed and claimed in this application is in addition to that disclosed in such prior applications, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of each such prior application and the national or PCT international filing date of this application:

PRIOR U.S. PROVISIONAL, NONPROVISIONAL AND/OR PCT APPLICATION(S)			Status	Priority Claimed Yes No
Application No. (series code/serial no.)	Day/MONTH/Year Filed		pending, abandoned, patented	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint Pillsbury Madison & Sutro LLP, Intellectual Property Group, 1100 New York Avenue, N.W., Ninth Floor, East Tower, Washington, D.C. 20005-3918, telephone number (202) 861-3000 (to whom all communications are to be directed), and the below-named persons (of the same address) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent, and I hereby authorize them to delete names/numbers below of persons no longer with their firm and to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/ organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct the above firm and/or a below attorney in writing to the contrary.

Paul N. Kokulis	16773	Dale S. Lazar	28872	Mark G. Paulson	30793	Michael R. Dzwonczyk	36787
Raymond F. Lippitt	17519	Paul E. White, Jr.	32011	Stephen C. Glazier	31361	W. Patrick Bengtsson	32456
G. Lloyd Knight	17698	Glenn J. Perry	28458	Paul F. McQuade	31542	Jack S. Barufka	37087
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Kevin E. Joyce	20508	G. Paul Edgell	24238	Richard H. Zaitlen	27248		
George M. Sirilla	18221	Lynn E. Eccleston	35861	Roger R. Wise	31204		
Donald J. Bird	25323	Timothy J. Klima	34852	Jay M. Finkelstein	21082		
Peter W. Gowdey	25872	David A. Jakopin	32995	Anita M. Kirkpatrick	32617		

(1) INVENTOR'S SIGNATURE: Jukka Suonvieri

Date: 04.12.00

First	Middle Initial	Family Name
Jukka		Suonvieri
Residence	City	State/Foreign Country
Tampere	Finland	FI X
Post Office Address	Country of Citizenship	
Jenseninkatu 27 B 6, FIN-33610 Tampere, Finland	Finland	
(include Zip Code)		

(2) INVENTOR'S SIGNATURE:

Date:

First	Middle Initial	Family Name
Residence	City	State/Foreign Country
Post Office Address	Country of Citizenship	
(include Zip Code)		

(FOR ADDITIONAL INVENTORS, check box ☐ to attach PAT 116-2 same information for each re signature, name, date, citizenship, residence and address.)